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Abstract

We know little about the commonality of folk beliefs around applications of psychological research on the unconscious control of behaviours. To address this, in Experiment 1 (N = 399) participants volunteered examples of where research on the unconscious has been applied to influence their behaviours. A subset of these were presented in Experiment 2 (N = 198) and Experiment 3 (N =100). Participants rated the extent to which the behaviour being influenced in these contexts was: 1) via the unconscious, 2) free, 3) the result of prior conscious intentions, 4) under conscious control. Relative to judgements about the extent to which behaviour was influenced via the unconscious, the remaining judgements regarding conscious control of behaviours were either higher (e.g., political contexts) or lower (e.g., therapy). This study is the first to show, using ecologically valid examples, the folk beliefs people share on psychological constructs concerning free will and determinism.

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Submission Files Included in this PDF

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Research Data Related to this Submission

Data set
https://www.dropbox.com/s/jca678jclx6bbca/revised%20open%20ended%20voluteered%20unconscious%20experiences.xlsx?dl=0

Overstepping unconscious boundaries: Folk beliefs on real world applications of psychological research on the unconscious

Excel data and Spss data files for experiment 1 and 2 of the experiments included in this study.

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Dear Prof Bachmann,

First of all, let me convey my thanks that I have been given the opportunity to submit a revision of my manuscript. The revised submission titled "Overstepping unconscious boundaries: Folk beliefs on real world applications of psychological research on the unconscious" includes three online experimental studies.

Below are the additional changes to the text in response to Reviewer 2's comments, as Reviewer 1 has accepted the changes made to the previous revised manuscript in response their comments. All changes made to the revised manuscript in response to Reviewer 2's comments are highlighted in red font in the main document.

Yours sincerely

Magda Osman

Reviewer 2

Comment 1: The author now claims that examples are ecologically valid and volunteered from the participants themselves. This does not solve the issue originally raised however. The sample used to derive the examples (Exp1) was different from the samples used to test beliefs (Exp2/3). Thus, we still don't know whether the critical participants from Exp2/3 have had experience with the examples or not. This needs to be stated more explicitly.

Response 1: First the claim regarding ecological validity was a revision in the text that was based on suggestions by Reviewer 2, for which I am extremely grateful as this helped with the way the details of the study was framed.

The sample from which participants were drawn for Experiment 1 and 2 were the same, participants were sampled using the same methods, and from the same four countries (i.e. US, UK, Canada, Australia), Experiment 3 include a sample that was specific to the UK only. In Experiment 1 there was no differences in the pattern of responses as function of country, and when specific analyses were conducted on specific categories (e.g., marketing, politics etc.), while the Reviewer is obviously correct in pointing out that there were differences in the frequencies of participants volunteering examples associated with marketing, specifically by political affiliation, there were no differences as a function of country.

The critical difference between Experiment 2 and 3 were that the experimental set up was different, and so the measures used in Experiment 2 and 3 tested for the way in which participants made judgments about the unconscious, free will, conscious control and conscious intentions with respect to the categories of examples that were derived from Experiment 1. What the study can't say is whether the sample of participants in Experiment 2 and 3 would volunteer the same range of examples as those generated in Experiment 1. But the aim of Experiment 2 and 3 were different anyway, because the aim for these experiments was to determine, given the examples generated from Experiment 1, what kinds of judgments participants made with respect to the four dimensions that they were presented.

The Reviewer is of course right that we don't know whether the critical participants from Exp2/3 have had direct experience with the examples or not, and this was not a question that was asked in Experiment 2 and 3. What both these experiments suggest is that, given that the examples they were presented with, age, gender, education, political affiliation, and religiosity (see Page 25) did not predict the variance in responses to each of the four judgment probes. And, in Experiment 1, neither age, gender, education and political affiliation predict the proportion of examples generated by each category.

Nevertheless, to reflect the point proposed by Reviewer 2, a statement on this is included in the general discussion in the "limitations and future considerations" section.

The additional text is "*Finally, the sample of participants in Experiment 1 were asked to volunteer examples of situations for which they believed that had experienced day to day situation of the application of psychological research on the unconscious control of behaviours. There is of course no way to determine from the current study whether participants sampled in Experiment 2 and 3 had the same experiences as those that were*

generated by those in Experiment 1. Those in Experiment 2 and 3 were presented with a revised set of examples, with some minor edits, from which they were asked to make several judgments, for which the regression analyses revealed that age, gender, education, political affiliation and religiosity did not significantly predict variance in responses. However, in addition to this, in retrospect an additional measurement probe that could have been included in these experiments was one that asked the extent to which participants had direct experience with the scenarios that they were presented. This way it would be possible to assess the extent to which direct experience with the scenarios impacted the judgments but also to determine the extent to which the samples in Experiment 2 and 3 were similar in their general folk beliefs to those sample in Experiment 1. A future replication and extension of this study that included a question of the kind proposed here would help to address this potential issue.".

Comment 2: The author mainly reports r2 values in the results sections. Please also provide an index containing directional information (e.g. beta estimates), to more clearly support claims of positive/negative relationships between specific variables.

Response 2: This has been done. The inclusion of beta estimates in the presentation of correlations is now included.

Highlights

- There is strong convergence of folk beliefs on the unconscious in natural examples
- Marketing is the most frequent example of the use of research on the unconscious
- Folk beliefs of constructs associated with the unconscious are context dependent

Title: Overstepping the boundaries of free choice: Folk beliefs on free will and determinism in real world contexts

Abstract

We know little about the commonality of folk beliefs around applications of psychological research on the unconscious control of behaviours. To address this, in Experiment 1 (N = 399) participants volunteered examples of where research on the unconscious has been applied to influence their behaviours. A subset of these were presented in Experiment 2 (N = 198) and Experiment 3 (N =100). Participants rated the extent to which the behaviour being influenced in these contexts was: 1) via the unconscious, 2) free, 3) the result of prior conscious intentions, 4) under conscious control. Relative to judgements about the extent to which behaviour was influenced via the unconscious, the remaining judgements regarding conscious control of behaviours were either higher (e.g., political contexts) or lower (e.g., therapy). This study is the first to show, using ecologically valid examples, the folk beliefs people share on psychological constructs concerning free will and determinism.

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3   world contexts

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5

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Abstract

We know little about the commonality of folk beliefs around applications of psychological research on the unconscious control of behaviours. To address this, in Experiment 1 (N = 399) participants volunteered examples of where research on the unconscious has been applied to influence their behaviours. A subset of these were presented in Experiment 2 (N = 198) and Experiment 3 (N =100). Participants rated the extent to which the behaviour being influenced in these contexts was: 1) via the unconscious, 2) free, 3) the result of prior conscious intentions, 4) under conscious control. Relative to judgements about the extent to which behaviour was influenced via the unconscious, the remaining judgements regarding conscious control of behaviours were either higher (e.g., political contexts) or lower (e.g., therapy). This study is the first to show, using ecologically valid examples, the folk beliefs people share on psychological constructs concerning free will and determinism.

26

Introduction

27

28 There are numerous ways in which psychologists and neuroscientists have characterised the

29 properties consciousness (e.g., Gangopadhyay, Madary, & Spicer, 2010; Kihlstrom, 2009;

30 Melnikoff, & Bargh, 2018; Newell & Shanks, 2014; Pennartz, 2018; Shea, & Frith, 2016).

31 However, in the broadest of terms, consciousness can be conceived of relating to matters

32 regarding awareness (e.g., of ourselves, of our social and physical environment), and control

33 (e.g., of perceptual-motor activities, of our social and physical environment). The focus of the

34 present study is to investigate folk beliefs on applications of psychological research on the

35 unconscious control of behaviours

36

37 Do people share similar beliefs regarding the ways in which psychological research on the

38 unconscious has been utilised beyond the academic world (e.g., advertising, government,

39 clinical practice)?. Which are the most commonly held beliefs? Moreover, if unconscious

40 control of behaviours is perceived to be used to influence behaviours in the real world, what

41 type of folk beliefs are there regarding the extent to which conscious choice and free-will are

42 maintained? To date, there has been no empirical work designed to answer these questions.

43 Therefore, the aim of this study, which includes three experiments, is to empirical answer these

44 questions.

45

46 *Folk beliefs on the unconscious and free will*. As mentioned, while there is little work

47 investigating the general views people hold regarding the application of psychological research

48 on the unconscious in daily life, there is work examining people's beliefs on the unconscious,

49 and more often their views on the relationship that this has to free will. For instance, Monroe

50 and Malle (2010) presented people with the question "Please explain in a few lines what you

51 think it means to have free will?", the responses of their student population were coded into

52 three categories: (a) decision or choice; (b) following one's desires; and (c) overcoming

53 (internal or external) constraints. The majority of participants volunteered responses falling

54 under the category of 'decision or choice' (65%), with another 33% of responses classified

55 under the option 'following one's desires', and 29% providing responses under the category of

56 overcoming external or internal constraints'. The findings suggest some overall agreement in

57 the belief that making a deliberate choice is a demonstration of having free will.

58

59 To further explore this, and to consider the role of determinism which was not a concept

60 explicitly referred to by participants in their first study, Monroe and Malle (2010) followed up

61 their study by presenting participants with the following statement "Neuroscientists claim that

62 free will is a false impression; that all of our behaviour is caused by our neural impulses; and

63 that any feelings of controlling our actions are an illusion." Participants were then asked, "Does

64 this sound believable to you?" and if they disagreed, they were asked to give an argument

65 against the claim. 49% of respondents rejected the claim posed to them, and when it came to

66 rejoinders to the claim, 55% gave responses that referred to having personal choice regardless

67 of the fact that neural impulses may be the underlying basis of behaviour. These, and other

68 findings examining folk beliefs on the unconscious and its association with free will show that

69 the preservation of choice is a strong indicator of conscious behaviour, and a critical indicator

70 of the presence of free will (e.g., Forstmann, & Burgmer, 2018; Malle, 2004; Malle & Knobe,

71 1997; Stillman, Baumeister, & Mele, 2011). This also supports theoretical and empirical work

72 suggesting the strong association that people make between conscious choice, and their sense

73 of personal agency and control (Osman, 2010, 2014). Moreover, the findings examining folk

74 beliefs regarding free will and consciousness also tend to suggest that people maintain a more

75   complex view of the relationship between the causal efficacy of their conscious choices, which

76   in turn is used as a proxy for free will (Osman, 2014).

77

78   In other work exploring the association between folk beliefs on the unconscious and free

79   choice, Shepherd's (2012) study finds general support for the view that people judge an agent

80   to have acted freely when presented with descriptions in which consciousness plays a central

81   causal role in an agent's behaviour. In addition, when consciousness does not play a central

82   causal role in an agent's behaviour, people tend to judge that the agent did not act freely. Here

83   the evidence suggests that people generally have nuanced beliefs about the central causal

84   relation between consciousness and free choice (Shepard, 2012; Stillman et al, 2011). In

85   Stillman et al's (2011) study, half of their participants were asked to volunteer examples that

86   refer to experiences in their life in which they took an action they considered to be of their own

87   free will. These were coded along several dimensions that included, positive outcomes, goal-

88   attainment, level of consciousness, moral behaviour, acting against external forces, long-term

89   self-interest and short-term self-interest. The study was able to show that general folk beliefs

90   around acting freely relate to experiences of conscious reflection that occurs prior to an action

91   taking place. It is worth noting that the study had independent researchers classify and rate the

92   examples according to different psychological constructs. However, it did not report details

93   about what the actual contexts were, or asked other participants to assess the volunteered

94   contexts according to their judgments and beliefs, instead; this would provide some insights

95   into general folk beliefs regarding experiences where volition is judged to be commonly present

96   and where it is absent.

97

98   Further work by Deutschländer, Pauen, and Haynes (2017) examined the way in which folk

99   beliefs impact the interpretation of daily events in relation to consciousness (in the presence of

100 a free action rather than determined by automatic or habitual processes), intention (the presence

101 or absence of conscious intention prior to the action being performed), and whether or not the

102 action is biologically driven (e.g. drinking because one is thirsty) or self-directed (e.g., picking

103 up a book to read). Participants were presented with 12 different scenarios of simple

104 descriptions of daily actions taken (drinking water, reading a book) in which 3 different

105 dimensions were varied (i.e. consciousness, intentions, biological determined actions), and

106 were asked to rate each scenario on the basis of ''How free was the presented action?'' (on a

107 scale from 1 = not free to 5 = free) and their confidence in their rating. Deutschländer et al

108 (2017) found that, a combination of prior intention to act, along with being free to act explained

109 the majority of ratings regarding the extent to which the scenarios demonstrated a free action.

110

111 The reviewed work on folk beliefs reveals a close relationship between consciousness and

112 deliberation taking place prior to acting, particularly when early intentions are formed prior to

113 what is judged by people to be a free choice. Furthermore, this work suggests that making

114 conscious decisions is directly related to beliefs about free choice, and that by extension in the

115 absence of making deliberate choices, people believe that they are less free (Vonasch,

116 Baumeister, & Mele, 2018). However, much of the work in the domain of examining folk

117 beliefs tends to involve participants responding to constructed realistic scenarios

118 (Deutschländer et al, 2017; Feltz, 2015; Forstmann, & Burgmer, 2018; Malle & Knobe, 1997;

119 Shepherd, 2012), but few are actually drawn from the participants' own experiences (Monroe

120 & Malle, 2010; Stillman et al's (2011). Therefore, the present study is motivated to further

121 explore people's lay beliefs on free will and determinism, by using ecologically valid examples

122 volunteered from the participants themselves.

123

124   Thus, to establish the generalisability of the pattern findings and to examine the range of actual

125   examples participants volunteer, which has also attracted little empirical attention, the present

126   study aims to address both. In particular, the present study examines the degree of convergence

127   of folk psychological beliefs of the unconscious and related constructs across people, when

128   they are presented with natural examples (by which is meant the examples that are freely

129   volunteered based on personal beliefs and experiences). In addition, it is worth noting that,

130   while Stillman et al. (2011) asked people to volunteer examples of instances in which they had

131   no free choice, they and others have yet to investigated the extent to which the relationship

132   between free will, conscious intentions, conscious control and the unconscious are associated

133   when people don't have free choice. This matters to the extent that it is possible to show that

134   the direction of the relationship between these four constructs is sensitive to the context in

135   which people are perceived to be acting freely or not, based on natural examples.

136

137   For instance, there is a large body of psychology research that examines the role of the

138   unconscious on behaviour (e.g., priming studies), which has had many applications in the real

139   world (e.g., advertising) (e.g., Bargh, 2002; Dijksterhuis et al, 2005; Martin, & Morich, 2011;

140   Yoo, Peña, & Drumwright, 2015). Similarly, there is an amassing literature on the use of

141   behavioural interventions, such as nudges – decision-support techniques, designed to direct

142   people to make better lifestyle choices for themselves around their health, finances and

143   wellbeing (e.g., Thaler & Sunstein, 200; Sunstein 2017). These methods often, though not

144   exclusively, rely on purported indirect methods of persuasion, such as presenting artwork on

145   stairwells to encourage people to use the stairs instead of elevators (e.g. (Åvitsland, Solbraa, &

146   Riiser, 2017; Kerr, Eves, & Carroll, 2001; Marshall et al., 2002), or the use default options,

147   such as opt-in investment and pension funds (e.g., Benartzi et al., 2017). There has been

148   considerable discussion on whether these methods are ethical assuming that they do change

149   people's behaviour without them being aware of the basis for that change (for review see - Lin,

150   Ashcroft, Osman, 2018; Osman, Lin, Ashcroft, 2018). Examples of this kind suggest that, if

151   information critical to making choices in the real world is presented in a way that people are

152   not conscious of, then they are likely to be making choices that are not under their conscious

153   control, and therefore, not construed as free. However, thus far, there is no empirical work that

154   examines peoples' folk beliefs regarding the applications of psychological research on the

155   unconscious control of behaviours in typical experiences in daily life, and so the aim of this

156   study is to explore this.

157

158   *Present study*: Experiment 1 was an exploratory study that presented people with a single open

159   ended question in which participants were asked to describe a typical context in which they

160   thought that psychological research on the unconscious had been used to manipulate people's

161   choices. The most common categories generated from Experiment 1 were used to form a set of

162   naturalist examples in Experiment 2. In Experiment 2 participants rated the examples according

163   to psychological properties that have been previously studied in the context of folk beliefs on

164   conscious choice and free will (Deutschländer et al, 2017; Malle, 2004; Malle & Knobe, 1997;

165   Stillman, et al, 2011), and Experiment 3 served as a replication of Experiment 2.

166

167   Experiment 1: Exploratory Study

168   **Methods**

169   *Design:* Experiment 1 was an exploratory study with a single independent variable, which was

170   the country in which the samples were randomly drawn. There were four countries in total,

171   each of which were English speaking (i.e. Australia, Canada, UK, US). There were two sets of

172   dependent variables, the first was four demographic questions (i.e. Age, Gender, Education

173   level, Political affiliation) and second main experimental question which was to volunteer a

174 typical example of a context in which participant thought psychological research on the

175 unconscious had been used to influence behaviour.

176

177 *Participants:* Experiment 1 included a total of 399 participants, US (Total $N = 99$), UK samples

178 (Total $N = 100$), Canadian (Total $N = 104$), and Australian (Total $N = 96$), (see Table 1). The

179 experiment was presented via Qualtrics which is an online platform for running experiments,

180 and launched via Prolific Academic - a crowd sourcing system for participant recruitment

181 worldwide. All participants were financially compensated for their time (60 cents). The

182 experiment gained ethics approval from Queen Mary University of London (QMUL) college

183 ethics board, QMERC2018/54. Participants were first given 1 probative question regarding the

184 influence of the unconscious on organisation and presented with 4 demographic questions (the

185 responses to which are summarised in Table 1).

186

187   Insert Table 1 about here

188 *Procedure:* After consenting to take part in the experiment, all participants were provided with

189 general instructions regarding the nature of the study "*…, in psychology the unconscious is*

190 *taken to mean many things. The simplest description is that the unconscious is a type of process*

191 *that influences what we do (thoughts, feelings, behaviours, attitudes, beliefs, judgments) in*

192 *some way without us being consciously aware of HOW it influences what we do. That is, there*

193 *is something that is guiding what we are doing at the back of our minds, but we can't easily*

194 *explain what it is, and how it might be doing that. In the space provided below, all you need to*

195 *do is describe a TYPICAL context, it could be any context, in which you tend to think that*

196 *psychological research on the unconscious has been used in some way to manipulate*

197 *behaviour. This question is left deliberately open so that you can answer in whichever way you*

198 *think captures a typical experience in which you think the unconscious was influenced in some*

199 *way that would in turn have changed your behaviour. There is no right or wrong answer, and*

200 *the answers that you will provide will be extremely informative.*" Participants were provided a

201 text box to enter their answers as an open ended response to the question. Once participants

202 had responded to this main question, they were presented with 4 demographic questions that

203 asked about their age, gender, education level, and political affiliation, after which the

204 experiment was complete. Participants were asked to fill in a text box to indicate their age, they

205 were asked to select from four response options (female, male, other, prefer not to say) when

206 indicating their gender, and for educational level they were required to fill in a text box to

207 indicate their highest level of education, and to do the same to indicate their political affiliation.

208

209 *Coding of open ended responses:* The full response set of all open ended responses can be

210 found on in the supplementary materials. The method of coding the responses was as follows.

211 After reading through all the responses, three independent coders generated categories that they

212 identified as the most common from the entire set of 399 responses. The categories generated

213 by each of the three coders is presented in Table 2. As can be seen from Table 2, many of the

214 categories that were generated were similar, though the coders varied in the number of

215 categories that they generated, (Coder 1 = 9, Coder 2 = 11, Coder 3 = 11).

216

217 From the categories generated, the coders were presented with each other's list, and when asked

218 to generated a complete set of categories that took into account the other identified categories,

219 a consensus was reached on the final set of 5 categories: **Marketing** (inclusive of sale,

220 advertising, marketing), **Research** (inclusive of psychology, medical research, and other

221 sciences that were referred to), **Therapy** (inclusive of hypnotherapy, clinical psychology),

222   ***Political*** (inclusive of political campaigns, government, Nudge[1]), ***Media*** (inclusive of social

223   media, TV, films). The same three independent coders where then required to apply the 5

224   agreed categories to the complete set of 399 responses. While coding the complete set three

225   additional categories were generated (***Don't know***, ***None***, ***Other***): these accounted for

226   responses in which the responded had answered "Don't know", responses in which respondents

227   had answered that there were no applications of psychological research that influence

228   behaviour in any context – 'None', and finally responses that included contexts (e.g., dating,

229   casinos, walking around parks, police tactics) which were infrequently referred and did not

230   directly fit into the 5 main categories identified by the coders – 'Other'.

231   Insert Table 2 about here

232   Results

233   *Inter-rater reliability*: In order to establish inter-rater reliability several tests were

234   implemented. First a correlational analysis was conducted. A Pearson's correlation coefficient

235   was applied to the ratings of Coder 1 and Coder 2 revealing, $r^2(399) = .928$ (high correlation),

236    $p = .000006$, Coder 1 and Coder 3 revealing, $r^2(399) = .896$ (high correlation), $p = .00003$, and

237   Coder 2 and Coder 3 revealing, $r^2(399) = .823$ (high correlation), $p = .00002$. Each analysis

238   suggested a high correlation between ratings between each coder. Second, the proportion of

239   disagreement between at least 2 coders for each of the 8 categories was coded was examined

240   (See Table 3). There were no categories in which responses were coded entirely differently by

241   each coder, therefore, the final responses set was based on responses that were classified

242   according the agreement of at least two coders, and of course by all three coders. The raw

243   frequencies were entered into a chi-squared analysis to determine if there were any differences

---

[1] Nudge refers to a programme of regulatory tools that governments currently use based on behavioural insights to develop soft interventions designed to shape the way people make decisions (e.g., the use of defaults such as Opt-Out organ donation registers that default people into donating, and if they do not wish to donate, they can opt-out (for details see Lin, Osman, Harris, & Read, 2018)).

244   in agreement/disagreement (coded as 1 =agreement, 2 disagreement). The analysis revealed

245   that there was no overall significant difference in the amount based on coding of the responses

246   to the 8 categories, Chi-squared (7) = 11.69, N =399, p = .11, though it should be noted that

247   there was an expected count of less than 5 for some of the categories. On this basis, a second

248   analysis was conducted omitting the three categories in which there were 0 disagreement (See

249   Table 3). An analysis was performed looking at the overall level of agreement in coded

250   responses to disagreement, Chi-squared (1) = 177.31, N =361, p = .0001, the analysis revealed

251   that there was significantly more agreement in the way responses were coded than

252   disagreement. Based on these analyses, the remainder of the results section is based on the

253   responses coded with the most agreement between coders.

254   Insert Table 3 about here

255   *Responses by Country*: The proportion of responses that fell into each category for each country

256   are presented in Table 4. The raw frequencies were entered into a chi-squared analysis to

257   determine if there were any differences in the pattern of responses by country. The analysis

258   revealed that there was no significant difference between countries based on their responses to

259   the categories, Chi-squared (21) = 26.65, N =399, p = .18.

260   Insert Table 4 about here

261   *Responses by Gender:* Collapsed across country, these analyses looked at whether there were

262   gender differences by responses. For ease of analysis only responses of those identifying

263   themselves as male or female were included. The analysis revealed that there was no significant

264   difference between genders based on their responses to the categories, Chi-squared (7) = 3.62,

265   N = 395, p = .82. *Responses by Age*: Collapsed across country, these analyses looked at whether

266   there were age differences by responses. To conduct this analysis respondents were categorised

267   into two age groups based on a media split of age (median = 28) (18-28, 29-80). The analysis

268   revealed that there was no significant difference in responses to the categories based on age,

269   Chi-squared (7) = 7.27, N = 399, p = .40. *Responses by political affiliation:* Collapsed across

270   country, these analyses looked at the impact of political affiliation on responses. Then

271   responses were re-classified according to participants' self-identification of political affiliation

272   into three categories into Liberal, Centre, and Conservative; responses reported as 'unsure'

273   were excluded. The analysis revealed that there was no significant difference in responses to

274   the categories based on political affiliation, Chi-squared (7) = 17.09, N = 345, p = .25.

275   *Responses by education level:* Collapsed across country, these analyses looked at the impact of

276   by education level on responses. Participants responses were re-classified according to those

277   that had a Bachelor's degree or higher level of classification and those without obtaining a

278   higher education degree. The analysis revealed that there was no significant difference in

279   responses to the categories by educational level, Chi-squared (7) = 5.19, N = 399, p = .63.

280

281   *Response by Category:* Given that there were no differences by country, responses were

282   collapsed across responses to look at whether the responses differed by category. All 8

283   categories were included in the analysis. The analysis revealed that there was a significant

284   difference in the frequencies of responses by category, Chi-squared (7) = 488.76, N =399, p =

285   .00002. Looking at Table 4, across all participants, the most common response was Marketing,

286   which accounted for approximately 45% of the responses, with the next most common response

287   being Research which accounted for approximately 18% of the responses, and Other, which

288   also accounted for 18% of the responses. *Responses under the Marketing category*: Given that

289   Marketing made up close to half of the responses that participants volunteered, these were

290   further analysed by country, age, gender, education and political affiliation. A chi-squared

291   analysis did not reveal any difference in the number of respondents volunteering examples by

292   country, Chi-squared (3) = .57, N =180, p = .90. When conducting binomial tests on gender,

293   significantly more men (N = 106) than women (N = 72) volunteered examples that fell under

294   this category (p = .01). The same test was performed on age, and no significant difference was

295   found by age (using the median split) (18-28, N = 90; 29-80, N = 90), and no significant

296   difference by level of education (Bachelors and above = 90, Other = 90). A chi-squared analysis

297   revealed a difference in the number of respondents by political affiliation (including only

298   categories Liberal = 91, Centre = 44, Conservative = 16), Chi-squared (2) = 57.07, N =151, p

299   = .0001. For those referring to advertising (n=106) as an example which fell under the category

300   of Marketing, 45% referred to the term subliminal or associated terms involving reference to

301   manipulation of the perceptions in the absence of peoples' awareness.

302

303   Experiment 1 Discussion

304   Experiment 1 revealed that at generally demographical and sample factors didn't play a major

305   role overall in the types of examples generated by participants, though gender and political

306   affiliation played a role for a sub-category (i.e. marketing) of examples that were generated.

307   More specifically, participants with a liberal leaning political affiliation were more likely to

308   generate responses in the marketing category compared to those with a centre, or more

309   conservative leaning political affiliation. Also, more men than women generated examples that

310   fell into this category. Without any *a priori* hypotheses, it is difficult to speculate on why these

311   particular demographic factors generated differences in the frequency of examples generated

312   in this category.

313

314   Given that general questions posed in this study that it aims to answer, the findings from

315   Experiment 1 indicate that, with exception of one subcategory, there is general convergence

316   across samples from different countries as to the examples they volunteer when it comes to

317   thinking about common applications of psychological research on the unconscious control of

318   behaviours. Also, in answer to the second which, which examples are most common, it appears

319   that marketing is the category to which the most frequent examples belong. In order to answer

320   the third question posed in this study, which is the extent to which people judge they have free

321   will in category of examples volunteered by participants, Experiment 2 was designed around

322   the ecologically valid materials from Experiment 1.

323

324   Experiment 2: Ratings tasks probing folk beliefs

325   The aim of Experiment 2 was to further explore folk beliefs on the applications of

326   psychological research on the unconscious control of behaviours, and to connect this to prior

327   work examining people's folk psychological beliefs on the unconscious and free will. Previous

328   studies have shown that people's folk beliefs on the unconscious are closely connected to free

329   will, conscious intentions, and control (Deutschländer et al, 2017; Malle, 2004; Malle &

330   Knobe, 1997; Stillman, et al, 2011). Therefore, to build on this work, the aim of Experiment 2

331   was to determine, based on an entirely natural set of materials, if, in the presented examples,

332   the direction of judgments would be as follows: The higher the ratings of unconscious influence

333   the lower the ratings of free will, and conscious control.

334

335   Methods

336   *Participants:* The experiment included a total of 198 participants, US (Total $N = 48$), UK

337   samples (Total $N = 52$), Canadian (Total $N = 49$), and Australian (Total $N = 49$), (see Table 2).

338   The experiment was presented via Qualtrics using the same crowd sourcing system as

339   Experiment 1. All participants were financially compensated for their time (90 cents).

340   Participants were presented with 5 demographic questions (the responses to which are

341   summarised in Table 5), and 4 ratings for each of the 16 examples drawn from volunteered

342   context described by participants in Experiment 1.

343

344   *Design:* Experiment 2 also had a single independent variable, which was the country in which

345   the samples were randomly drawn from. These were the same four countries as in Experiment

346   1 (i.e. UK, Canada, US, Australia). There were two sets of dependent variables, the first was

347   five demographic questions (i.e. Age, Gender, Education level, Political affiliation, Religiosity)

348   and the second set was the four ratings for each of the 16 examples drawn from those generated

349   in Experiment 1. The presentation of each example was randomised for each participant, along

350   with the ordering of each of the four rating questions presented for each example.

351   Insert Table 5 about here.

352   *Materials:* The criteria for generating the examples used in Experiment 2 were the following:

353   1) the examples were drawn exclusively from the 5 main categories revealed in Experiment 1,

354   2) the examples were more than 10 words long, and less than 50 words long; 3) they identified

355   a single context in which the unconscious was thought to influence behaviour; 4) there was no

356   overt or highly personalised opinions about whether or not the application of psychological

357   research on the unconscious in the context described was good or bad; 5) there were no

358   personalised references to subjective experiences of the application of psychological research

359   on the unconscious in contexts that they had felt had influenced their behaviour; 6) there were

360   no explicit references to named brands, companies, firms; 7) there were no explicit references

361   to technical terminology (e.g., nudge, implicit attitude tests, automatic association). Following

362   the application of these 7 criteria to the 384 examples from Experiment 1 (excluding, NO and

363   Don't know responses), a total of 96 met the criteria, from which 16 were selected (see Table

364   6).

365   Insert Table 6 about here

366   To get to the final agreed 16 examples, the raters applied the following additional criteria to

367   the 96 screened examples: 1) the examples has to be simple and easy to understand; 2) the

368   details has to be specific enough to identify the context and the targeted behaviour, 3) the

369   descriptions had to be neutral.

370

371   The four main dependent measures used to assess judgments of the 16 examples were as

372   follows, each of with a response scale ranging from 0 = not at all to 10 = completely. Rating of

373   the Unconscious: *To what extent do you think that [reference to method of influence] influences*

374   *[reference to behaviour] unconsciously*? Ratings of Free Will: *To what extent do you think that*

375   *[reference to the behaviour] under the influence [reference to method of influence] is the result*

376   *of free choice*? Ratings of Conscious intentions: *To what extent do you think that [reference to*

377   *the behaviour] under the influence [reference to method of influence] is the result of conscious*

378   *intentions formed before [reference to behaviour]*? Ratings of Conscious Control: *To what*

379   *extent do you think that [reference to the behaviour] under the influence [reference to method*

380   *of influence] is under conscious control*?

381

382   *Procedure:* The same procedure in Experiment 1 was used in Experiment 2, with the following

383   differences. Participants were given instructions regarding the fact that they would have 16

384   examples to think about and for each example, they were make a rating on four different

385   dimensions (Ratings of the Unconscious, Ratings of Free Will, Ratings of Conscious intentions,

386   Ratings of Conscious Control), and that when they had completed all four ratings for each of

387   the 16 examples, and provided their demographic details (these were presented in the same

388   way as Experiment 1, but for the inclusion of religiosity, for which participants were asked to

389   type in a text box provided if they identified with a particular belief system, otherwise if they

390   preferred not to say, they were simply asked to type an 'X' in the free text box), the experiment

391   would be complete.

392

393   Results

394   *Comparison by country*: The ratings for each of the four dependent variables (Ratings of the

395   Unconscious, Ratings of Free Will, Ratings of Conscious intentions, Ratings of Conscious

396   Control) were each collapsed across the 16 different scenarios, so that an overall mean rating

397   was calculated for each of the four dependent variables. From this, a Univariate analysis of

398   variance was performed on each of the dependent variables to determine the extent to which

399   ratings differed by country (See Figure 1). The analyses revealed that for each of the ratings

400   there were no differences by country; Ratings of the Unconscious, $F(1,194) = .26$, $p = .86$,

401   partial eta = .004; Ratings of Free Will $F(1,194) = .58$, $p = .62$, partial eta = .01; Ratings of

402   Conscious Intentions $F(1,194) = 1.34$, $p = .26$, partial eta = .02; Ratings of Conscious Control,

403    $F(1,194) = .46$, $p = .71$, partial eta = .007.

404   Insert Figure 1 about here.

405   *Relationship between the four ratings*: A one-tailed Pearson's correlation was conducted, to

406   examine the extent to which the following predicted pattern was detected: There should be a

407   negative relationship between ratings of unconscious and the other three ratings (i.e. free will,

408   prior conscious intentions, conscious control). The analyses did not confirm this prediction.

409   They revealed a positive correlation between ratings of Free Will and ratings of Conscious

410   Intentions $r^2(198) = .43$ (moderate correlation), ($\beta = .29$), $p < .00005$, as well a positive

411   correlation between ratings of Free Will and ratings of Conscious Control $r^2(198) = .45$

412   (moderate correlation), ($\beta = .31$), $p < .00005$. Ratings of Conscious Intentions were also

413   positively correlated with ratings of Conscious Control, $r^2(198) = .47$ (moderate correlation),

414   ($\beta = .36$), $p < .00005$. No other correlational analyses were found to be significant, suggesting

415   that overall, there was no relationship between ratings of the Unconscious and Free will,

416   Conscious Intentions, and Conscious control, but a positive relationship with the remaining

417   three ratings.

418   *Differences in mean ratings by context***:** The mean ratings were calculated separately for each

419   context (e.g., mean rating of the Unconscious for the context 'marketing' were based on

420   averaging across the 5 different examples for that context). Then each dependent variable was

421   subjected to an analysis of variance. When comparing the 5 different contexts (Marketing,

422   Research, Therapy, Political, Media) on ratings of the Unconscious, a repeated ANOVA, with

423   country as the between subject factor, did not reveal a significant main effect of context,

424   $F(1,194) = 3.15$, $p = .07$, partial eta = .02; no significant main effect of country was found and

425   no interaction effects. The same analysis performed on ratings of Free Will revealed a main

426   effect of context, $F(1,194) = 9.10$, $p < .005$, partial eta = .05, as was the case with ratings of

427   Conscious Intentions, $F(1,194) = 22.69$, $p < .0005$, partial eta = .11, and ratings of Conscious

428   Control, $F(1,194) = 23.74$, $p < .0005$, partial eta = .11. In each case, there was no significant

429   main effect of country, and no interaction effects. The indication here is that the context

430   impacted the pattern of ratings of Free Will, Conscious Intentions, and Conscious Control but

431   not ratings of the Unconscious. To examine these patterns more closely the remaining analysis

432   considers each of the ratings in each context individually.

433

434   *Ratings in Marketing Contexts*: The ratings for each of the four dependent variables (Ratings

435   of the Unconscious, Ratings of Free Will, Ratings of Conscious Intentions, Ratings of

436   Conscious Control) were collapsed across the 5 different marketing scenarios and averaged,

437   (See Figure 2). Paired sample t-tests were conducted. The analyses revealed that when

438   compared against ratings of the Unconscious, ratings of Free Will were significantly higher (M

439   = -.43, $SD = 2.36$, N = 198), $t(197) = 2.55$, $p = .01$, BF = .72), as were ratings of Conscious

440   Control ($M = 1.30$, $SD = 2.51$, N = 198), $t(197) = 7.29$, $p < .00005$, $BF_{10} = 0.18$), but no

441   significant difference was found when compared with ratings of Conscious Intentions ($M = -$

442   .11, $SD = 2.49$, N = 198), $t(197) = .61$, $p = .54$, BF = 14.73). Thus, in the context of marketing,

443   average ratings of the Unconscious were significantly higher than Free Will and Conscious

444   Control.

445   Insert Figure 2 about here.

446

447   *Ratings in Research Contexts*: When it came to the overall mean ratings under the context

448   "Research" (see Figure 2), the analyses revealed that when compared against ratings of the

449   Unconscious, ratings of Free Will were significantly lower ($M = 1.76$, $SD = 2.71$, N = 198),

450    $t(197) = 9.12$, $p < .000005$, $BF_{14} = 1.85$), as were ratings of Conscious Intentions ($M = 1.77$,

451    $SD = 2.68$, N = 198), $t(197) = 9.32$, $p < .000005$, $BF_{15} = 5.13$), and ratings of Conscious Control

452   ($M = 1.88$, $SD = 2.72$, N = 198), $t(197) = 9.73$, $p < .000005$, $BF_{16} = 3.53$). Thus, in the context

453   of research, average ratings of the Unconscious were significantly higher than Free Will,

454   Conscious Intentions and Conscious Control.

455

456   *Ratings in Therapy Contexts*: The overall mean ratings for each of the four dependent variables

457   were analysed (see Figure 2). Comparing against ratings of the Unconscious, ratings of Free

458   Will were significantly lower ($M = 2.14$, $SD = 3.86$, N = 198), $t(197) = 7.82$, $p < .000005$, BF_{11}

459   = 5.55), as were ratings of Conscious Intentions ($M = 1.90$, $SD = 4.10$, N = 198), $t(197) = 6.54$,

460    $p < .000005$, $BF_8 = 7.60$), and ratings of Conscious Control ($M = 2.24$, $SD = 4.09$, N = 198),

461    $t(197) = 7.70$, $p < .00005$, $BF_{10} = 1.12$). Thus, in the context of therapy, average ratings of the

462   Unconscious were significantly higher than Free Will, Conscious Intentions and Conscious

463   Control.

464

465   *Ratings in Political Contexts*: The mean ratings for each of the four dependent variables across

466   the 2 different political examples were analysed (see Figure 2). Comparing against ratings of

467   the Unconscious, ratings of Free Will were significantly higher ($M = -1.22$, $SD = 3.16$, N =

468   198), $t(197) = 5.45$, $p < .00005$, $BF_5 = .02$), as were ratings of Conscious Intentions ($M = -.88$,

469   *SD* = 3.12, N = 198), *t*(197) = 3.98, *p* < .0005, BF = .009), and ratings of Conscious Control

470   (*M* = -.84, *SD* = 3.04, N = 198), *t*(197) = 3.86, *p* < .0005, BF = .01). Thus, in the context of

471   politics, average ratings of the Unconscious were significantly lower than Free Will, Conscious

472   Intentions and Conscious Control.

473

474   *Ratings in Media Contexts*: The mean ratings for each of the four dependent variables across

475   the 2 different media scenarios (see Figure 2), revealed that, when comparing against ratings

476   of the Unconscious, there were no significant differences to ratings of Free Will (*M* = .003, *SD*

477   = 3.19, N = 198), *t*(197) = .01, *p* = .99, BF 17.72), ratings of Conscious Intentions (*M* = .25,

478   *SD* = 3.10, N = 198), *t*(197) = 1.15, *p* = .25, BF = 9.24), and ratings of Conscious Control (*M*

479   = .35, *SD* = 3.13, N = 198), *t*(191) = 1.57, *p* = .12, BF = 5.27). In the context of the media,

480   average ratings of the Unconscious were not significantly different from Free Will, Conscious

481   Intentions and Conscious Control.

482

483   Experiment 2: Discussion

484   Overall, across all four countries the ratings people gave regarding the involvement of the

485   Unconscious, Free Will, Conscious Intentions and Conscious Control in the 16 examples they

486   were presented were similar. Correlational analyses revealed positive associations between

487   ratings of Free Will, Conscious Intentions and Conscious Control, though ratings of the

488   Unconscious were not associated with the other three ratings. While ratings of the unconscious

489   did not significantly differ by context, looking at the five different contexts (Marketing,

490   Research, Therapy, Politics, Media), for research and therapy the patterns suggested that

491   ratings were higher for the involvement of the unconscious relative to ratings of free will,

492   conscious intentions and conscious control. The opposite pattern was found in marketing and

493   political contexts where ratings of the involvement of the unconscious were lower relative to

494   ratings of free will [marketing, political], conscious intentions [political] and conscious control

495   [marketing, political]. Thus, while ratings of the involvement of the unconscious in behaviour

496   was the same across contexts, ratings of free will, conscious intentions and conscious control

497   did discriminate by context, in which they were either consistently higher (marketing,

498   political), or lower (research, therapy) relative to the ratings of the involvement of the

499   unconscious influences on behaviour.

500

501   Experiment 3: Replication of Ratings tasks probing folk beliefs

502   Given that the materials that were investigated in Experiment 2, the purpose of Experiment 3

503   was to examined the replicability of the findings reported in Experiment 2. In all respects

504   Experiment 3 was identical to Experiment 2, except that the sample tested were all from the

505   UK (see Table 5), and 100 participants were recruited in total to take part.

506

507   Results

508   *Relationship between the four ratings*: Consistent with the findings in Experiment 2,

509   Experiment revealed a positive correlation between ratings of Free Will and ratings of

510   Conscious Intentions $r^2(100)$ = .48 (moderate correlation), (β = .31), p < .00005, as well a

511   positive correlation between ratings of Free Will and ratings of Conscious Control $r^2(100)$ =

512   .49 (moderate correlation), (β = .29), p < .00005. Ratings of Conscious Intentions were also

513   positively correlated with ratings of Conscious Control, $r^2(100)$ = .58 (high), (β = .48), p <

514   .0000005. In addition, in line with the prediction tested in Experiment 2, there were weak

515   negative relationships between ratings of the Unconscious and rating Conscious Control,

516    $r^2(100)$ = .23 (low), (β = -.27), p < .05, and with ratings of Free Will, $r^2(100)$ = .19 (low), (β =

517   -.15), p < .05.

518

22

519 *Differences in mean ratings by context***:** When comparing the 5 different contexts (Marketing,

520 Research, Therapy, Political, Media) on ratings of the Unconscious, a repeated ANOVA

521 revealed a significant main effect of context, $F(1,99) = 4.03$, $p < .05$, partial eta = .04. The same

522 analysis performed on ratings of Free Will revealed a main effect of context, $F(1,99) = 20.55$,

523 $p < .00000001$, partial eta = .17, as was the case with ratings of Conscious Intentions, $F(1,99)$

524 $= 13.10$ $p < .000001$, partial eta = .12, and ratings of Conscious Control, $F(1,99) = 5.11$, $p <$

525 $.05$, partial eta = .05. To examine these patterns more closely the remaining analysis considers

526 each of the ratings in each context individually.

527

528 *Ratings in Marketing Contexts*: The analyses revealed that when compared against ratings of

529 the Unconscious, ratings of Free Will were not significantly different ($M = .31 = 2.95$, N =

530 100), $t(99) = 1.06$, $p = .29$, BF = 7.3), as were ratings of Conscious Control ($M = .24$, $SD =$

531 2.60, N = 100), $t(99) = .94$, $p = .35$, BF = 8.19), and ratings of Conscious Intentions ($M = .29$,

532 $SD = 3.03$, N = 100), $t(99) = 1.00$, $p = .34$, BF = 7.97). Thus, in the context of marketing,

533 average ratings of the Unconscious were not significantly different from Free Will, Conscious

534 Intentions and Conscious Control.

535

536 *Ratings in Research Contexts*: When it came to the overall mean ratings under the context

537 "Research" (see Figure 2), the analyses revealed that when compared against ratings of the

538 Unconscious, ratings of Free Will were significantly lower ($M = 2.35$, $SD = 2.90$, N = 100),

539 $t(99) = 8.11$, $p < .000005$, $BF_{10} = 1.80$), as were ratings of Conscious Intentions ($M = 1.89$, SD

540 $= 2.94$, N = 100), $t(99) = 6.44$, $p < .000005$, $BF_7 = 4.56$), and ratings of Conscious Control (M

541 $= 2.31$, $SD = 3.12$, N = 100), $t(99) = 7.40$, $p < .000005$, $BF_9 = 5.33$). Overall, consistent with

542 Experiment 2, Experiment 3 revealed that for research, average ratings of the Unconscious

543 were higher than Free Will, Conscious Intentions, and Conscious Control.

544

545 *Ratings in Therapy Contexts*: The overall mean ratings for each of the four dependent variables

546 were analysed (see Figure 2). Comparing against ratings of the Unconscious, ratings of Free

547 Will were significantly lower ($M = 2.86$, $SD = 4.33$, N = 100), $t(99) = 6.59$, $p < .00005$, $BF_7 =$

548 2.30), as were ratings of Conscious Intentions ($M = 2.30$, $SD = 4.11$, N = 100), $t(197) = 5.59$,

549 $p < .000005$, BF = .00001), and ratings of Conscious Control ($M = 2.92$, $SD = 4.28$, N = 198),

550 $t(197) = 6.81$, $p < .00005$, $BF_8 = 8.23$). Thus, consistent with Experiment 2, Experiment 3

551 revealed that in the context of therapy, average ratings of the Unconscious were significantly

552 higher than Free Will, Conscious Intentions and Conscious Control.

553

554 *Ratings in Political Contexts*: The mean ratings for each of the four dependent variables across

555 the 2 different political examples were analysed (see Figure 2). Comparing against ratings of

556 the Unconscious, ratings of Free Will were not significantly higher ($M = -.52$, $SD = 3.70$, N =

557 100), $t(99) = 1.40$, $p = .16$, BF = 4.81), and nor were ratings of Conscious Control ($M = -.58$,

558 $SD = 3.28$, N = 100), $t(99) = 1.75$, $p = .08$, BF = 2.83), but Ratings of Conscious Intentions

559 were ($M = 1.06$, $SD = 3.34$, N = 100), $t(99) = 3.17$, $p < .0005$, BF = .11), Thus, in political

560 contexts, Experiment 3 partially replicated Experiment 2, indicating that average ratings of the

561 Unconscious were significantly lower than Conscious Intentions.

562

563 *Ratings in Media Contexts*: The mean ratings for each of the four dependent variables across

564 the 2 different media scenarios (see Figure 2), revealed that, when comparing against ratings

565 of the Unconscious, there were no significant differences with Conscious Intentions ($M = .51$,

566 $SD = 3.41$, N = 100), $t(99) = 1.50$, $p = .13$, BF 4.23). Ratings of the Unconscious were

567 significantly higher than ratings of Free Will ($M = .93$, $SD = 3.90$, N = 100), $t(99) = 2.37$, $p<$

568 .05, BF = .84), and ratings of Conscious Control ($M = .82$, $SD = 3.40$, N = 100), $t(99) = 2.38$,

569 $p < .05$, BF = .82). In the context of the media, average ratings of the Unconscious were

570 significantly higher than Free Will, and Conscious Control.

571

572 *Regressions*: Given that the same demographics questions were presented in Experiment 2 and

573 3, regression analyses were conducted separately on each of the four main ratings

574 (Unconscious, Free Will, Conscious Intentions, Conscious Control). Ratings of Unconscious

575 were examined for associations with Experiment (Experiment 2, Experiment 3), age, gender,

576 education, political affiliation, and religiosity. The result of the regression indicated the 6

577 predictors explained .08% of the variance (R^2 .03; $F(7,286) = 1.34$, $p = .23$). The predictors

578 failed to explain a significant proportion of the variance for Ratings of Free Will, (R^2 .02;

579 $F(7,286) = 2.04$, $p = .05$), Ratings of Conscious Intentions (R^2 .004; $F(7,286) = .82$, $p = .57$)

580 and Ratings of Conscious Control (R^2 .02; $F(7,286) = .36$, $p = .93$).

581

582   Experiment 3: Discussion

583 Consistent with Experiment 2, overall, across all four countries the ratings people gave were

584 similar. Correlational analyses replicated the same pattern as Experiment 2, suggested that

585 there is a strong positive association between ratings of Free Will, Conscious Control and

586 Conscious Intentions. In line with the prediction tested in Experiment 2, for which there was

587 no evidential support, in Experiment 3 there was a weak negative relationship between ratings

588 of the Unconscious and Conscious Control, as well as the Free will. Regression analyses based

589 demographic and experimental factors failed to reveal any statistically reliable association

590 between the predictors and the four main ratings.

591

592 Experiment 2 partially replicated the pattern of findings reported in Experiment 2 with respect

593 to relative comparisons of ratings of the Unconscious to the other ratings by context. Average

594   ratings of the involvement of the unconscious relative to ratings of free will, conscious

595   intentions and conscious control were higher for Research and Therapy context, and also

596   Media. In addition, there was a partial replication of the pattern found in political contexts,

597   where ratings of the Unconscious were lower than Conscious Intentions. For Marketing there

598   were as no difference between ratings, which failed to replicated the pattern found in

599   Experiment 2.

600

601   **General Discussion**

602   The aim of this study was twofold. The first was to investigate which, if any, popular contexts

603   emerge from responses to an open question asking *which context has psychological research*

604   *on the unconscious been applied*? The findings from Experiment 1 suggest that across four

605   different countries, the frequency and range of examples were broadly similar, of which the

606   most commonly generated was marketing; more men, and more people identifying as liberals

607   in their political affiliation generated examples under this category.

608

609   There may be many reasons for why marketing (which included sales, advertising, and

610   marketing itself) as a context featured so commonly amongst volunteered responses. One

611   reason is that advertising and marketing have often been associated with subliminal advertising

612   (for a brief review see Osman, 2014, 2018), which in turn has a long historical association with

613   unconscious manipulation (Sheehan, 2013). Also, some have speculated that the association

614   between subliminal processing and advertising is well known and may even play into the

615   public's continuing suspicion about the uses of advertising (Broyles, 2006). Thus, marketing,

616   more broadly as a category of methods that utilise psychological research on the unconscious,

617   dating back to the 50's (Packard, 1957), this context may be the foremost example available in

618   people's memory which is why it was the most frequently volunteered example.

619

620   Experiment 2 and Experiment 3 presented a subset of examples from Experiment 1 to

621   participants. Again, across four different countries the pattern of ratings of the unconscious,

622   free will, conscious intentions, and conscious control were similar. Using a natural set of

623   examples, the present study was able to extent previous work (e.g., Deutschländer et al, 2017;

624   Malle, 2004; Malle & Knobe, 1997; Stillman, et al, 2011) suggesting that higher ratings of

625   unconscious influence on behaviour, are associated with lower ratings of free will, and

626   conscious control and the formation of prior conscious intentions.

627

628   More specifically, there was weak support for the prediction that was tested, there was a

629   negative relationship between ratings of the unconscious, and free will (not supported),

630   conscious intentions (Experiment 3) and conscious control (Experiment 3). Also, when

631   examining the average ratings of the Unconscious relative to the other three by context, several

632   patterns emerged. The three were either higher than ratings of the Unconscious in Marketing

633   (Experiment 2) and Politics (Experiment 2, Experiment 3), or lower than ratings of the

634   unconscious in Therapy (Experiment 2, Experiment 3), Research (Experiment 2, Experiment

635   3), and Media (Experiment 3). This reveals a relative ranking of contexts with respect to the

636   level of conscious control, intent, and free will is experienced, given the level of unconscious

637   influence. While, Experiment 1 revealed that marketing is the most commonly volunteered

638   example of applications of psychological research on the unconscious, the success of this

639   technique to manipulate people without their knowing seems to be doubtful based on responses

640   in Experiment 2 and 3. In both marketing and political contexts behaviours such as voting or

641   purchasing products were judged to be under greater conscious control, made freely, and

642   involve prior consciously formed intentions presumably because the techniques used in

643   marketing and political contexts are judged to exert less influence on the unconscious as

644 compared to professional contexts such therapy and medical research. In the case of therapy,

645 the examples were of hypnotherapy, and for research, the examples included demonstrations

646 of placebo effects to playing messages while sleeping. When it comes to examples of this kind,

647 public opinion (e.g., Gardener & Brown, 2013; Johnson, & Hauck, 1999; Yu, 2004) is very

648 much in line with empirically demonstrations of the close associations these examples have to

649 a lack of conscious control and free will (e.g., Baars, Ramsøy, & Laureys, 2003; Haggard et al,

650 2004).

651

652 The findings from Experiment 2 and 3 provide compelling support for previous work that

653 suggests a close relationship between the concepts of the unconscious and those associated

654 with volition (free will, conscious control, prior conscious intentions). Moreover, Experiment

655 2 and 3 was able to show that the relationship between the unconscious and volition is context

656 dependent. That is, contexts in which techniques used to influence behaviour are seen to vary

657 according to their ability to target the unconscious to manipulate behaviour in an intended

658 direction (by the agent implementing the technique). This in turn has consequences for

659 perceived levels of conscious control or agency over actions taken in those contexts. It might

660 be the case that people actually do have accurate beliefs about the extent to which they can

661 preserve conscious choice and free will over their actions in a variety of contexts, contrary to

662 the many demonstrations of misconceptions they have about other areas of psychology

663 (Bensley, & Lilienfeld, 2017). Alternatively, it might be the case that people are adamant in

664 preserving the belief that they are consciously responsible for their actions in contexts that

665 matter to them (e.g., exercising their voting rights, purchasing behaviours), but will loosen the

666 reigns of responsibility in other contexts where they are more comfortable deferring to the

667 professional (e.g., hypnotherapists, medical researchers). If this is the case, then further work

668 is needed to establish the attributions about the intentions behind different kinds of agents (e.g.,

669   advertisers, policy makers, therapists, journalists, social media marketeers). The reason being

670   that the underlying intentions attributed to the agent may interact with the level of conscious

671   control people are willing to relinquish, or want to maintain. Thus, work of this kind can help

672   uncover whether the basis on which public beliefs about the influence on the unconscious vary

673   according to the how much agency and control over the behaviour is valued (Osman, 2014).

674

675   *Limitations and future considerations:* The virtue of the present study was that the materials

676   used were highly ecologically valid, however to keep things fairly open and easy for

677   participants to respond, there was some imprecision that was lost in the way the instructions

678   were presented, and the questions that were posed to participants. These needs to be highlighted

679   given that this increased the ambiguity in several areas of the study regarding the way the

680   "unconscious" could have been interpreted by participants on which they then generated their

681   responses.

682   For instance, the definition of unconscious presented to participants in Experiment 1 was very

683   broad, and while that was deliberate as to not restrict the kinds of examples participants would

684   volunteer, a follow-up study could easily compare the range of examples that participants

685   would generate depending on the type of definition of the unconscious that was presented to

686   them. For example, Deutschländer et al (2017) manipulated the dimensions regarding the type

687   of action depending on the degree that it was a biologically necessary action (e.g., drinking

688   water because one is dehydrated), and this had an impact, along with other factors, when

689   gauging how free an action is. Also, Monroe and Malle (2010) manipulated the instruction they

690   presented to participants regarding the underlying basis of behaviour as neurological or not,

691   which in turn influenced the pattern of responses regarding judgments of free will of actions.

692   Thus, by extension, it might be the case that participants would volunteer a different range of

693   examples where they believe insights from psychological research have been applied to

694   manipulate the unconscious when the definition of the unconscious is framed from an

695   exclusively neurological basis. Therefore, this is an important consideration regarding the

696   interpretation of the present findings because the range of examples generated in Experiment

697   1, on which materials were used to examine judgments on free will in Experiment 2 and 3 are

698   bound to the wide definition of the unconscious presented to participants to begin with.

699   The second issue is that in Experiment 2 and 3 participants were presented with one judgment

700   probe (i.e. unconscious) that was open to a lot of interpretation, and the remaining three (i.e.

701   free will, conscious control, conscious intentions) which, one might argue, are a little more

702   prescriptive in their interpretation. Without independently ascertaining whether, for instance,

703   participants take a dualist position or not on the unconscious, or other positions they take, there

704   would be no way to ascertain their interpretation of, and therefore the kind of response they

705   gave to the question "*To what extent do you think that [reference to method of influence]*

706   *influences [reference to behaviour unconsciously*?*]*". Any future studies that are conducted

707   would need to either include several other questions to determine the general position that

708   participants take with regards to the unconscious, when surveying folk beliefs on the

709   unconscious in specific instances, because clearly their position in turn impacts their beliefs on

710   free will (e.g. Nadelhoffer, Shepard, Nahmias, Sripada, & Ross, 2014).

711   Another critical limiting factor is that the focus of the present study was on folk beliefs on the

712   unconscious with a specific emphasis on the control of behaviour. However, as noted in the

713   introduction consciousness also concerns attention as well as a control. Considerations of

714   attentional aspects of consciousness invite a range of phenomena not commonly considered by

715   participants in the present study (e.g., subliminal perception, creativity, pain perception,

716   attentional biases). Therefore, a natural extension of the present study would be to investigate

717   the complement to control by framing the study on examining folk beliefs on consciousness

718   with respect to attentional factors.

719 Finally, the sample of participants in Experiment 1 were asked to volunteer examples of

720 situations for which they believed that had experienced day to day situation of the application

721 of psychological research on the unconscious control of behaviours. There is of course no way

722 to determine from the current study whether participants sampled in Experiment 2 and 3 had

723 the same experiences as those that were generated by those in Experiment 1. Those in

724 Experiment 2 and 3 were presented with a revised set of examples, with some minor edits, from

725 which they were asked to make several judgments, for which the regression analyses revealed

726 that age, gender, education, political affiliation and religiosity did not significantly predict

727 variance in responses. However, in addition to this, in retrospect an additional measurement

728 probe that could have been included in these experiments was one that asked the extent to

729 which participants had direct experience with the scenarios that they were presented. This way

730 it would be possible to assess the extent to which direct experience with the scenarios impacted

731 the judgments but also to determine the extent to which the samples in Experiment 2 and 3

732 were similar in their general folk beliefs to those sample in Experiment 1. A future replication

733 and extension of this study that included a question of the kind proposed here would help to

734 address this potential issue.

735 **General Conclusions**

736 The present study sought to answer, by using an ecologically valid approach, three questions

737 to which we did not previously have the answer to. The first being: *Do people share similar*

738 *beliefs regarding the examples of applications of psychological research on the unconscious*

739 *control of behaviours?* The findings from Experiment 1 suggest that, when comparing samples

740 drawn from four different countries (Australia, Canada, UK, US) there is general convergence

741 in the types of examples people freely volunteer. The second question being: *Which are the*

742 *most common examples?* The findings from Experiment 1 reveal that the most frequently

743 generated examples fall under the category Marketing (which includes advertising). The third

744   being: *If unconscious control of behaviours is perceived to be used to influence behaviours in*

745   *the real world, what type of folk beliefs are there regarding the extent to which conscious*

746   *choice and free-will are maintained?* The findings from Experiment 2 and 3 reveal that people

747   have a nuanced assessment of the maintenance of free will, and relatedly, conscious control,

748   and conscious intentions in different contexts for which psychological research on unconscious

749   manipulations of behaviour is suspected to be applied (e.g., marketing, politics, therapy,

750   media). Relative to rating the influence of the unconscious on behaviours in these contexts, if

751   ratings of the unconscious are low, then correspondingly, ratings of free will, conscious control,

752   and conscious intentions can often be higher (e.g. Context: Politics, Experiment 2 and 3), and

753   vice versa, where rating of the unconscious are high, then ratings of free will, conscious control

754   and conscious intentions can be low (e.g. Context: Therapy, Experiment 2 and 3).

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Figure 1. Mean ratings (SE +/- 1) of the Unconscious, Free Will, Conscious Intentions and
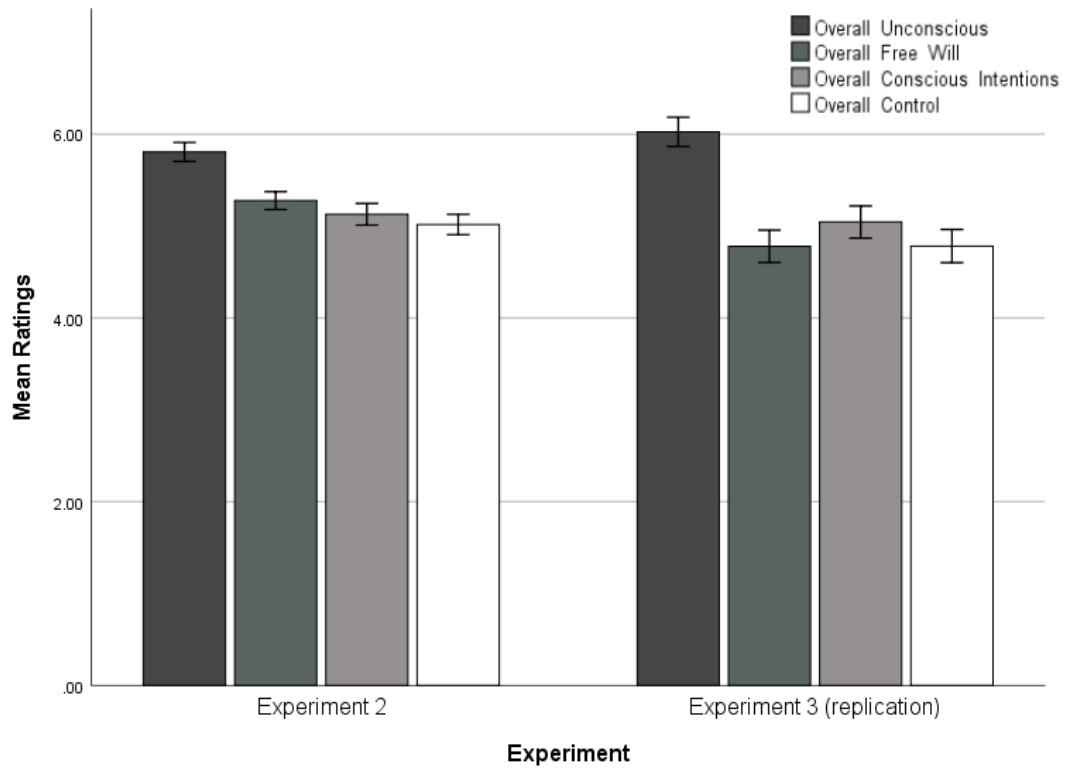
Conscious Control by Experiment 2 and 3

Figure 2. Mean ratings (SE +/- 1) of the Unconscious, Free Will, Conscious Intentions and

Conscious Control for each of the 5 contexts presented to participants, by Experiment.
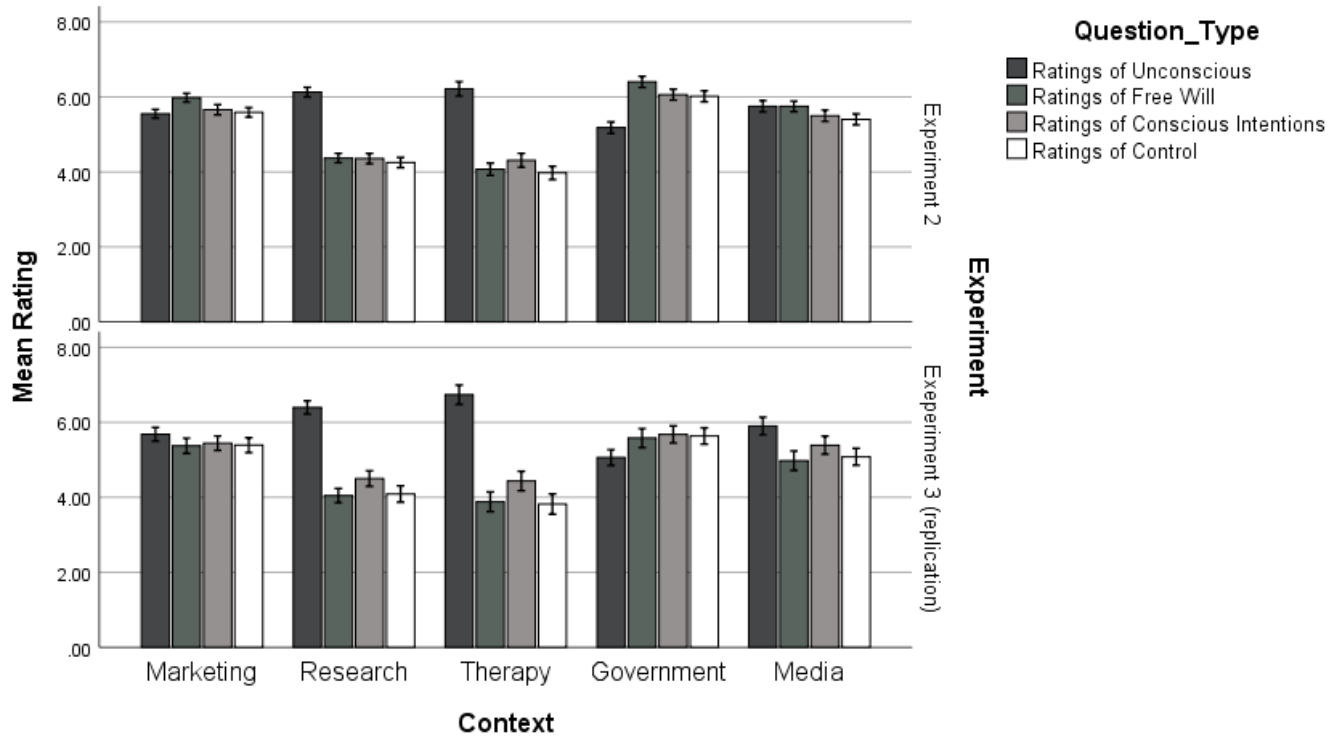
Table 1. *Participants profile from Experiment 1*

Sample	US	UK	Canada	Australia
Total participants	*N* = 99 (all US residents, US nationals, first language English)	*N* = 100 (all UK residents, UK nationals, first language English)	*N* = 104 (all Canadian residents, Canadian nationals, first language English)	*N* = 96 (all Australian residents, Australian nationals, first language English)
Females	29 (29%)	66 (66%)	32 (31%)	36 (37.5%)
Males	70 (71%)	32 (32%)	71 (68%)	59 (61.5%)
Prefer not to say	0	2 (2%)	1 (%)	1 (1%)
Age	Mean 30.54 (*SD* = 10.88) ranging from 18-68	Mean 33.32 (*SD* = 11.13) ranging from 19-80	Mean 29.49 (*SD* = 9.30) ranging from 18-61	Mean 29.53 (*SD* = 11.12) ranging from 18-67
Educational background	52.1% qualified with a degree (at bachelor degree and postgraduate level), 47.9% responded with Prefer not to say/other.	47.5% qualified with a degree (at bachelor degree and postgraduate level), 52.5% responded with Prefer not to say/other.	59.8% qualified with a degree (at bachelor degree and postgraduate level) 40.2% responded with Prefer not to say/other.	60.4% qualified with a degree (at bachelor degree and postgraduate level), 39.6 %responded with Prefer not to say/other.
Political affiliation	57.5% identifying as liberal, 22.3% as centre, 14.9% as conservative, and 4.3%% as prefer not to say/unsure/other	49.5% identifying as liberal, 23.2% as centre, 13.2% as conservative, and 14.1% as prefer not to say/unsure/other	55.9% identifying as liberal, 20.6% as centre, 9.8% as conservative, and 13.7 % as prefer not to say/unsure/other	54.2% identifying as liberal, 12.5% as centre, 11.5% as conservative, and 21.9 as prefer not to say/unsure/other

Table 2. Categories generated by each of the three coders

Categories	Coder 1	Coder 2	Coder 3
1	Advertising	Advertising	Advertising
2	Marketing	Consumer choices/Marketing	Sales/Retail
3	Research	Scientific studies	Shopping
4	Therapy	Psychology	Psychological research
5	Hypnosis	Hypnosis	Casinos
6	Social Media	Hypnotherapy	Psychotherapy
7	Media (TV, FILM)	Clinical	Hypnosis
8	Political	Social Media	Hypnotherapy
9	Voting	Government	Media
10		Nudging	Elections
11		Police	Religion

Table 3. The proportion of responses in which there was disagreement between at least two coders.

Category	Disagreement across all three coders
Marketing	10.5%
Research	16.6%
Therapy	23.5%
Media	26%
Political	0%
Other	19.2
No	0%
Don't know	0%

Table 4. The proportion of responses by country and gender.

Category	Overall	US	UK	Canada	Australia	Female (N=163)	Male (N=232)	Prefer not to say (N=4)
Marketing	45.1	42.4	44	43.3	51	44.2	45.7	50
Research	18.0	20.2	10	21.2	20.8	17.2	19.0	
Therapy	4.3	6.1	6	1.9	3.1	4.9	3.9	
Media	4.8	2.0	9	3.8	4.2	6.1	3.9	
Political	6.3	7.1	6	5.8	6.3	7.4	5.6	
Other	18.3	20.2	19	22.1	11.5	17.2	18.5	50
No	1.3	0	3	0	0	1.8	.9	
Don't know	2.0	2	3	1.9	3.1	1.2	2.6	

Table 5. *Participants profile from Experiment 2 and 3*

Sample	Experiment 2				Experiment 3
	US	**UK**	**Canada**	**Australia**	**UK**
Total participants	*N* = 48 (all US residents, US nationals, first language English)	*N* = 52 (all UK residents, UK nationals, first language English)	*N* = 49 (all Canadian residents, Canadian nationals, first language English)	*N* = 49 (all Australian residents, Australian nationals, first language English)	*N* = 100 (all UK residents, UK nationals, first language English)
Females	24 (50%)	35 (67%)	21 (43%)	21 (43%)	69 (69%)
Males	22 (46%)	17 (33%)	28 (57%)	28 (57%)	31 (31%)
Prefer not to say	2 (4%)	0	0	0	0
Age	Mean 31.81 (*SD* = 10.02) ranging from 18-59	Mean 33.03 (*SD* = 9.12) ranging from 18-61	Mean 30.65 (*SD* = 98.45) ranging from 18-56	Mean 28.50 (*SD* = 7.54) ranging from 18-50	Mean 36.28 (*SD* = 12.19) ranging from 19-66
Educational background	33.3% qualified with a degree (at bachelor degree and postgraduate level), 47.9% college level, 18.8% prefer not to say/other	44.2% qualified with a degree (at bachelor degree and postgraduate level), 40.4% college level, 8% prefer not to say/other	63.3% qualified with a degree (at bachelor degree and postgraduate level), 22.4% college level, 14.3% prefer not to say/other	67.3% qualified with a degree (at bachelor degree and postgraduate level), 18.4% college level, 14.3% prefer not to say/other	58% qualified with a degree (at bachelor degree and postgraduate level), 29% college level, 13% prefer not to say/other
Political affiliation	37.5% identifying as liberal, 31.3% as centre, 14.6% as conservative, and 16.7% as prefer not to say/unsure/other	30.8% identifying as liberal, 17.3% as centre, 7.7% as conservative, and 44.2% as prefer not to say/unsure/other	34.7% identifying as liberal, 16.3% as centre, 8.2% as conservative, and 40.8 % as prefer not to say/unsure/other	38.8% identifying as liberal, 14.3% as centre, 6.1% as conservative, and 40.8 % as prefer not to say/unsure/other	40% identifying as liberal, 0% as centre, 9% as conservative, and 51% as prefer not to say/unsure/other
Religosity	47.9% identifying as having a religion, 35.4% identifying as having no religion, 16.7% prefer not to say/other	55.8% identifying as having a religion, 19.2% identifying as having no religion, 25% prefer not to say/other	49% identifying as having a religion, 34.7% identifying as having no religion, 16.3% prefer not to say/other	46.9% identifying as having a religion, 38.8% identifying as having no religion, 14.3% prefer not to say/other	45% identifying as having a religion, 36% identifying as having no religion, 19% prefer not to say/other

Table 6. Final selection of descriptions generated by participants in Experiment 1, and the modified versions used in Experiment 2.

	Domain	Original Description from Exp 1.	Modified Description For Exp 2.
1.	Marketing	Advertisement jingles have been researched and implemented with the intention of having people unconsciously think of the product or service when they hear it and want to use that service or buy that product mentioned.	Advertisement jingles that are used so that people think of the product or service when they hear the jingle and then buy that service or buy the product.
2.		Subliminal messaging, such as seeing how the exposure of a product can leave an impression on someone for an extended amount of time, no matter how small the impression.	Subliminal adverts (messaged flashed so quickly that they are not aware of seeing them) that presents a product so that it stays in people's mind and they then go and buy the product.
3.		Advertisers utilize psychological research in order to maximize their chance of selling to you, like 'Buy two get one free' sales where the buyer thinks they are getting a great deal.	Advertisers that increase their chance of selling to people when using 'buy two get one free' sales on products so that people think that they are getting a great deal.
4.		When purchasing things at a supermarket, psychological research has shown eye level is good, and end of row displays are more eye catching, thus manipulating people into purchasing particular things.	Supermarkets that present goods at eye level and at the end of row displays so that they are more eye catching to people to influence their purchasing of particular products.
5.		Dealership or other areas where a sales person or someone is trying to steer a person to making the decision they want, the way certain questions are posed and actions are taken are deliberately taken to steer the person to spend more money and make more for the dealership	Car Dealerships that employ staff to steer people by the way that they pose certain questions so that people spend more money.
6.	Research	In research when showing someone a picture of something before a study so it is in their minds, then having them pick between it and something else during the study.	Research that involves showing people a picture of something before a study so that it is in their minds, in order to study the influences on their choice when asked to select between the same picture and another picture.
7.		Studies involving people sleeping. When they are asleep they have had messages played to them and they may influence their unconscious mind.	Research studying people sleeping that involves playing messages to them while they are asleep to examine the influence on their mind.
8.		Giving them sugar cubes and pretending that they're pills, and the pills having an affect on them due to their mental belief.	Research that involves giving people sugar cubes posing as pills to study the influence on peoples mental belief that the pills will have an effect on them.
9.		Flashing a positive or negative stimulus so quickly that the person does not consciously see it before another stimulus will affect that person's attitude towards the second stimulus.	Research that flashes up positive or negative information so quickly that people are not aware of seeing it, and then studying how this will effect peoples' attitudes towards the quickly flashed up information.
10		Examining implicit bias and how it forms. For instance, causing negative or positive associations towards a neutral stimulus and seeing if it affects people's perception of it.	Research that examines biases by creating either positive or negative links with a neural piece of information, and then studying how it effects the way people then perceive the information.
11	Hypnosis/ therapy	Hypnosis techniques work on people while they are unconscious and then it is possible to manipulate their choices more easily while	Hypnotic methods that are used on people while they are in a relaxed state so that it is possible to influence their choices while they

		under that state.	are under that state.
12		Hypnosis is one of the ways we can uncover hidden secrets of the unconscious mind and then begin to heal from past traumas.	Hypnotic methods that are used on people to uncover hidden memories so that it is possible to heal them from past traumas.
13	political	Research on the unconscious has been used to present political party leaders in a certain way to sway the public's vote choice, such as how they dress and speak.	Political campaigning that helps political party leaders to dress and speak in a certain way so that it is possible to influence people's voting choice.
14		It has been used to target ads to specific groups of people so that they lean towards one political candidate (Manipulating the voters into leaning towards some candidate)	Political campaigning that uses political advertisements targeted towards specific groups of people in such a way as to influence them towards one political candidate over another.
15	media	Social Media through targeted advertising that can be used to manipulate people's opinions	Social Media that use advertisements targeted towards specific groups of people in such a way as to influence their opinions.
16		Social media is an example. The experience has been tailored to influence the unconscious minds of users.	Social Media that is designed in such a way so that the people using the social media experience it in such a way that it influences the way that they think.

Title: Overstepping the boundaries of free choice: Folk beliefs on free will and determinism

in real world contexts

I conducted the data collections, analysis and developed the methods, this was a sole effort, with minor help from project students in helping with the coding of the responses in Experiment 1.

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